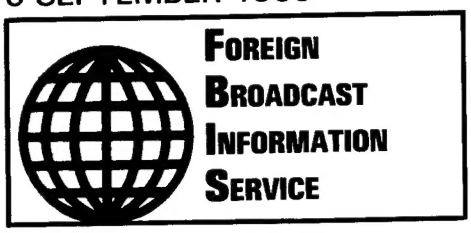
JPRS-CEN-89-008
6 SEPTEMBER 1989



JPRS Report

Science & Technology

CHINA: Energy

Science & Technology
China: Energy

JPRS-CEN-89-008 6 September 1989

CONTENTS

NUCLEAR POWER

SUPPLEMENTAL SOURCES

CONSERVATION

Energy Minister Puts in Plug for Nuclear Power

40130117a Beijing KEJI RIBAO in Chinese 20 Jun 89 p 2

[Article by Liu Zhiwei [0491 1807 0251] and Wang Gaixian [3769 2395 3807]: "Talking About Nuclear Power in Light of Power Shortage—Interview With Chief Engineer of Nuclear Industry Zang Mingchang [5258 2494 2490] of the Ministry of Energy Resources"]

[Text] Many local policy makers are complaining about the shortage of coal which makes their investment in thermal power plants useless.

"This appears to be a long-term problem," Chief Engineer Zang Mingchang commented calmly. The authors met this nuclear expert at the Chinese National Energy Workshop. His firm commitment to the development of nuclear power in China was contagious.

Thermal power is the primary energy source in China. It consumes coal, which is mined and must be transported by railroad. Since the primary coal resources are located in northwestern and northern China, the vast amount of coal consumed along the southeastern coast and southern cities is shipped by rail. Coal transportation takes up 40 percent of the railroad freight capacity. Although coal cars are being moved day and night demand still cannot be met. Due to a shortage of shipping capacity, many power plants in the east and northeast regions were running out of coal late last year. Several generators had to be shut down to wait for coal to arrive.

Power shortages have caused China to suffer a 30 percent reduction in productivity, and frequent blackouts have caused residents many inconveniences. The burden on thermal power generation is getting heavier every year. Up to the year 2000, it will be difficult to keep up with demand unless we put in 8 MkW (million kilowatts) of generator systems yearly. An additional 8 MkW of generators will further aggravate the tight coal-transportation situation. In addition, air pollution will become more severe due to increased coal consumption.

It is time to use nuclear power to share the burden. Nuclear power is considered to be clean, causes far less pollution, lowers cost and requires very little transportation capacity. However, it takes a long time to construct a nuclear power plant and costs a great deal of capital. The safety requirements are high. It takes a high-level technical team and an equipment-manufacturing industry.

The nuclear industry has been under development in China for 30 years, and a system has gradually been formed. During the development of nuclear weapons, a reasonably comprehensive nuclear fuel recycling system was established to handle fuel exploration, mining, concentration, element fabrication and post-treatment, and nuclear waste processing and disposal. It provides the conditions necessary for the development of nuclear power: technology, facilities and management skills.

Based on the policy issued by the State Council for development of nuclear power, the Ministry of Energy Resources has officially included it into the energy development plan. Before 2000, nuclear power is in a preparation and start-up stage. It is a relatively difficult step. The guideline is to collaborate with other countries with the focus centered on China. In order to get a fast start, we must rely on the experience gained by other countries and import some advanced technology. However, we need to firmly grasp the technology and begin manufacturing the equipment in China to form our own nuclear power industry system.

In this century, we have set certain goals. Specifically, we want to build 6 million kW of nuclear-power-generating facilities, including finishing the power plants under construction at Qinshan and Daya Bay. After the year 2000, nuclear power in China will enter a fast-growing stage.

It seems that nuclear power is the solution to alleviating the severe power-shortage problem in some local areas. How safe is it? Everyone is not quite comfortable with it.

"It is quite safe," said the chief engineer, who attended Qinghua University to study nuclear reactors in the late 1950's and has worked extensively on nuclear-power research and pressurized-water reactors (PWR's).

China primarily plans to develop PWR power plants. There are 417 nuclear power plants in the world and 54 percent of them are PWR's. These nuclear power plants have been operating safely over long periods of time and have provided us with a great deal of experience.

This type of power plant has three safety shields to prevent the escape of radioactive materials. It starts with the fuel casing which contains the radioactive fission products in the zirconium-alloy tube. Should the casing break, a pressure housing capable of withstanding 150 atmospheric pressure is there to contain radioactivity. The outer safety containment is a prestressed reinforced concrete building lined with 6-mm-thick steel plate in the 0.9-m-thick wall. It has excellent sealing characteristics and can hold up against tornadoes, earthquakes, light airplane impacts, etc. When the second barrier is destroyed, it can also withstand the internal steam pressure.

Every country has adopted comprehensive safety procedures and established detailed quality assurance, equipment safety, and rigorous testing and monitoring systems. China is acutely aware of the importance of nuclear safety. The Chinese National Nuclear Safety Bureau was established in the start-up stage to formulate a series of rules and regulations to govern nuclear safety. A comprehensive nuclear safety legal system, comparable to those in developed nations, will be perfected.

Next year, unit one of the domestically designed Qinshan power plant will go on the grid. By then nuclear power will be a part of China's power resources. We believe that this new rising star will benefit the Chinese people.

Largest Transformer Station To Be Built in Shenzhen

40130099a Guangzhou NANFANG RIBAO in Chinese 16 Apr 89 p 2

[Article by Zhao Sen [0340 2773]: "Shenzhen To Build China's Largest Transformer Station"]

[Text] To adapt to connection of Daya Bay Power Station with the Guangdong-Hong Kong Electric Power System and meet demand for electricity in Shenzhen City, China and Hong Kong have decided to join in building an enormous 500 kV transformer station with a 3.3 million VA total capacity at Dahe Village in Shenzhen City.

The design calls for the 500 kV Shenzhen Transformer Station to install two huge 900,000 VA transformers to convert the 500 kV power source transmitted from Daya Bay Nuclear Power Station to 400 kV and transmit it to Yuanwang Transformer Station of the Jiulong [Kowloon] primary grid. Two additional 750,000 VA primary transformers will be installed to reduce Guangdong's 500 kV primary grid power source to 220 kV for supplying electricity to Shenzhen City. The preliminary design for this transformer station was completed in late 1988 and is now being examined. The plan is for the Shenzhen Transformer Station to be completed and transmit power in March 1991.

Hainan's Power Development Surpasses Plan

40130117b Beijing RENMIN RIBAO (OVERSEAS EDITION) in Chinese 6 Jun 89 p 3

[Article by correspondent Zhao Shengyu [6392 0524 3768]: "Hainan Becomes an Electric-Power-Abundant Province"]

[Text] Since the completion of the expansion of the Haikou power plant, Hainan has become an electric-power-abundant province.

When Hainan first became a province, power shortages were a problem. Many factories were shut down due to lack of electricity. The noise of diesel generators could be heard every night. According to the manager of the Haikou power plant, four new generators with a total capacity of 150,000 kW have been put into operation, generating a possible 2,000,000 kilowatt-hours per day, with an actual output of 1,000,000 kilowatt-hours daily. Only one of the two 50,000-kW generators needs to be running. Electric power development is at least 3 to 5 years ahead of schedule.

It is reported that two more 125,000-kW generators being constructed as the second-phase project funded by the International Investment Corporation of Hong Kong and Macao will come on line in the next 2 years. A 100,000-kW generator will be built in the third phase at the Haikou power plant. By then, the plant will have a total capacity of 1,000,000 to 1,100,000 kW with a total investment of over 1 billion yuan.

The initial construction phase of the 600,000-kW (installed capacity) Daguang hydropower station has essentially been completed. Construction will begin soon.

Experts believe that the power surplus in Hainan also reflects the weakness of its industry. It was reported that the total output value of Hainan's industry last year was only over 2 billion yuan.

Beijing Power Outages on the Rise

40100062a Beijing XINHUA in English 0828 GMT 24 Jul 89

[Text] Beijing, July 24 (XINHUA)—Beijing has suffered intermittent power shortages this summer owing mainly to the temporary shutdown of a set of 250,000 kilowatt generators at the Douhe Thermal Power Plant.

The power supply to Beijing was cut by 80,000 kilowatt-hours by the shutdown of the generators, according to a CHINA DAILY report today.

An official from the Beijing Municipal Power Supply Bureau was quoted as saying that power cuts in residential areas are on the rise and about 1,000 power cuts on different lines are arranged a day to guarantee the supply to key departments and enterprises.

At present, the annual consumption of electricity in the capital is about 14 billion kilowatt-hours, but only about 9 billion can be generated in the city while the rest is supplied by Hebei and Shanxi Provinces.

The Douhe Thermal Power Plant, with a generating capacity of 1 million kilowatts, is located in Tangshan City in Hebei Province. It is one of the major power suppliers to the capital.

According to the paper, the suspension of the generators at the Douhe Thermal Power Plant was caused by insufficient coal supply because of heavy rains and flooding.

Officials in Beijing said that normal operation of the plant could be resumed by the end of the month. They also urge urban residents to save electricity.

It is estimated that Beijing will need 14.88 billion kilowatt-hours of electricity this year.

According to a report from the Ministry of Energy, several power plants near Beijing are expected to be put into operation next year, helping to alleviate the power shortage in the capital.

Issues To Be Resolved in Accelerating Hydropower Development

40130113 Beijing SHUILI FADIAN [WATER POWER] in Chinese No 6, 12 Jun 89 pp 3-6

[Article by Yang Xiaoying [2799 2556 5391] of the China International Engineering Consulting Company: "Two Issues That Must Be Resolved To Accelerate Hydropower Development—Views on Structural Readjustment in the Electric Power Industry and Establishing a Hydropower Development Corporation"]

[Text] We are now experiencing our biggest energy shortage in the last 20 years and inadequate power is now a major problem which has restrained economic and social development in China for a long time. In a situation in which coal production and inadequate transport capacity are restricting hydropower development and nuclear power is just getting off the ground, the electric power industry must gradually shift its focus to hydropower in a major effort to develop China's rich hydropower resources. Many articles discussing this question have been published in various periodicals and increasing numbers of people acknowledge it and are raising a growing cry. The industries and products given key support for the capital construction industry in the "Decisions on Main Points of Current Industrial Policy" which were recently formally announced by the State Council included hydropower. For this reason, I will discuss some ideas and proposals for the two areas of readjusting the structure of the electric power industry to develop more hydropower and establishing a hydropower development corporation to promote hydropower construction as references for research by policymaking departments.

I. Readjust the Electric Power Industry Structure, Develop More Hydropower

Given a serious loss of coordination in energy resources, particularly the ratio between the electric power industry and industrial and agricultural development, the state adopted several measures to readjust the economic structure and industrial structure and implemented the principles of "protect" and "promote" for the energy resource industry. However, China's economic strengths are limited and we cannot substantially increase investments in energy construction in the short term. Thus, structural readjustment in the electric power industry is of extremely great and real significance for solving the problems of an imbalance between supply and demand of electric power.

Structural readjustment in the electric power industry as used here actually includes issues at two levels: One is readjustment of the internal structure of thermal power and hydropower, meaning the question of the proportion of large, medium, and small-scale power stations and power station deployment. The other is the question of the proportion of thermal, hydro, and nuclear power, the components of the electric power industry, which also mainly concerns the proportion of thermal and hydropower. We cannot ignore either issue at these two levels. They must be earnestly studied and resolved.

China's thermal power comes mainly from coal-fired generators. Thermal power now accounts for 70 percent of China's installed generating capacity and about 75 to 80 percent of our yearly power output. The crux of the problem is the lack of coordination between the rate of growth in thermal power and the rate of growth in coal production and transport capacity. When considering plans and rates of growth for thermal power, we should link up with potential coal supplies and readjust the proportion between them to avoid possible mistakes due to short-term behavior which only considers present interests. Otherwise, a situation may appear in which the scale of thermal power installed generating capacity continues to grow while it is uncertain that power output can continue to grow because some generators will be "cooking a meal without rice" and be unable to operate normally and produce electricity. When selecting thermal power station sites, we should be particularly concerned with the question of building more pit mouth power plants and readjusting the proportions of large, medium-sized, and small generators, which also deserves earnest research. I will not discuss this question further here and will only discuss the proportions of hydropower and thermal power and questions of the proportion and deployment of large, medium, and small-scale power stations within the context of hydropower.

We know that hydroelectric power generation involves simultaneous development of primary and secondary energy resources. The cost of electric power is very low and a one-time investment provides long-term benefits. Startup of hydropower generators is flexible, they are suited to peak regulation and grid overhaul, and they can effectively increase the reliability of grid operation. Hydroelectric power generation burns no coal and produces little pollution, and it can provide comprehensive benefits in flood prevention, irrigation, water-borne shipping, urban water supplies, tourism, aquaculture and breeding, and other areas. Looking at the present situation, the most significant thing is that converting hydropower resources into electricity burns no coal, so major development of hydropower surely could alleviate the shortage of primary energy resources (mainly coal) and reduce the pressure on railways to haul coal. Statistics show that at the end of 1988, China's installed hydropower generating capacity was 32.39 million kW and yearly power output was 105 billion kW, equivalent to coal savings of 50 to 60 million tons. China is the world's richest nation in hydropower resources but the extent of development is very low and many sites which have suitable locations, good geological conditions, and superior technical economic indices have yet to be developed. Hydropower can play an even greater role in electric power supplies, conserving coal, and reducing pressure on transport. For these reasons, readjusting the proportion of hydropower and thermal power and appropriate development of more hydropower are now key issues in readjusting the internal structure of the

electric power industry. Projections by relevant experts are that by the end of this century, the shortage of coal production may grow to 120 million tons and there will be no overall change in the communications and transport shortage situation. A coal shortage of 40 million tons for generating thermal power (calculated at a coal shortage of 1/3) would mean that 15 million kW of thermal power generators would have to shut down, reducing yearly power output by 70 billion kWh. Calculating on the basis of the conservative figure of 3 yuan in value of output per 1 kWh of power, the effects on the gross value of industrial and agricultural output would exceed 200 billion yuan. Attention also should be given here to the fact that inadequate transport capacity could affect normal operation of some thermal power generators. On the other hand, although the investment would be somewhat greater if we reduce thermal power somewhat and build an additional 20 million kW of hydropower, we could generate an additional 60 billion kWh-plus of electricity and save over 30 million tons of coal. This basically could fill in the shortage of coal supplies in the electric power industry and prevent direct economic losses of more than 200 billion yuan. It also could save more than 30 million tons in transport capacity and improve the coal supply shortage situation in the households of urban residents, the iron and steel industry, coking, the chemical industry, and so on, and the indirect economic benefits would be extremely apparent.

Of course, readjustment in the proportion of hydropower and thermal power as used here does not mean demanding hydropower development without developing thermal power, nor does it have the general sense of substantially increasing hydropower as a proportion of the entire electric power industry and reducing the proportion of thermal power. Readjusting the proportion as used here refers to using the perspective of development trends to suggest issues, begin with reality in making proposals, and appropriately increase the investment proportion in hydropower depending on the capacity of state financial resources. The goal is to strive to maintain the installed hydropower generating capacity at the level of almost 30 percent of the total installed generating capacity in China's electric power system to the year 2000 and to hold power output from hydropower at no less than 20 percent of total national power output. Concretely speaking, it involves completion and startup of about 80 million kW in installed generating capacity at hydropower stations by the end of this century and completing a definite scale of projects under construction in the early 21st century to generate power.

In the area of readjustments in the proportions and deployments of large, medium, and small-scale hydropower stations within hydropower, I feel that what should be given particular attention in our current hydropower development is building 25,000 to 250,000 kW medium-sized hydropower stations. The scale of investments in medium-scale hydropower is much smaller than for large hydropower stations. The construction schedule only takes 3 to 5 years. We should seize the 10-plus years remaining before 2000, particularly the period of the Eighth 5-Year Plan, and strive to complete 10 million kW in medium-sized hydropower stations which produce 40 billion kWh of power annually, equivalent to saving 20 million tons of coal. Moreover, all rural villages and towns which have hydropower resources should actively develop small hydropower stations to meet the household and production power needs of rural villages and towns. We of course cannot relax in building large hydropower stations. At present we mainly should focus on building projects now under construction and striving to complete them and generate power on schedule or ahead of schedule. We also should begin several suitable large hydropower projects with good locations, high benefits, and suitable investments to maintain a certain scale of projects under construction and ensure reserve strengths for hydropower construction.

The goal we face in hydropower construction is magnificent and there are real possibilities, but it is very difficult and we must create conditions in many areas and make unremitting efforts.

II. Establish a Hydropower Development Corporation, Push Hydropower Construction Forward

For the past 10-plus years, there has been an extremely obvious decline in the rate of growth in hydropower in China. This can be seen quite clearly in the yearly rate of growth in installed hydropower generating capacity: it was 21.5 percent from 1953 to 1957 (First 5-Year Plan), 18.5 percent from 1958 to 1962 (Second 5-Year Plan), 8.3 percent from 1963 to 1965 (3 years of readjustment), 15.6 percent from 1966 to 1970 (Third 5-Year Plan), 16.6 percent from 1971 to 1975 (Fourth 5-Year Plan), 8.6 percent from 1976 to 1980 (Fifth 5-Year Plan), and 6.0 percent from 1981 to 1985 (Sixth 5-Year Plan). The rate of growth in hydropower construction rose in the first 3 years of the Seventh 5-Year Plan but the overall trend of slower growth in hydropower construction has not been reversed.

There is no single cause for the drop in the rate of hydropower construction. Instead, it is complex and concerns many areas, including understandings and guiding ideology, planning and construction, and the management system. Their primary manifestations are inadequate understanding of their economy, hesitation and frequent changes in guiding ideologies for hydropower development, and a decentralized and weak management system for hydropower construction. Electricity prices, credit, and taxation relationships which have major effects on hydropower construction have not been straightened out. The decline of hydropower in investments in the electric power industry has shrunk preparatory work, the scale under construction, and so on. Statistics show that investments in hydropower as a proportion of total investments in the electric power industry were 39 percent in 1979 and 29.5 percent in

1983, a decline of more than 10 percentage points. Reform of the investment system after 1984 did not improve the situation. Given our inability to increase the self-development capacity of hydropower under present conditions and limited capacity for raising funds, the result has been a further decline in the proportion of hydropower investments to 25.2 percent in 1984 and just 20.2 percent in 1987. If it continues to develop along this trend, hydropower as a proportion of the whole electric power industry will be far lower than present levels both in terms of installed generating capacity and power output.

To change the present passive situation in hydropower, we must adopt effective measures in many areas. State policy-making departments should correctly evaluate the economy of hydropower, give more attention to hydropower, revise hydropower development plans prior to the year 2000, increase investments in the energy resource industry, increase the proportion of investments in the energy resource industry including the electric power industry, and increase the proportion of investments in hydropower construction within the electric power industry. We must strive to study and formulate a set of principles and policies conducive to hydropower self-development including electricity price, credit, and taxation policies and make a major effort to support hydropower development. We should make immediate reforms in the existing decentralized hydropower management system, establish hydropower development funds, and so on. This is especially true of the urgency and major real significance of reforms in the management system. The reason is that if we do not solve problems in the management system, which means formulating preferential state policies to increase investments in hydropower, and if we lack effective organs to adhere to and implement them, they will not be able to be completely effective.

Hydropower construction is an integral and systematic production process which includes many links like planning, survey and design, construction, operation and power generation, power transmission and transformation, consumption by users, and other areas. Each link is tied to the others and problems in one link can affect the whole production process. Based on the requirements of the properties of hydropower itself and the basic characteristics of the production process, we should establish as quickly as possible a hydropower development corporation with full responsibility for work to develop hydropower to use support from the related state policies and specific funds to motivate initiative fully in all areas for hydropower construction and achieve using hydropower to develop hydropower, self-accumulation, and self-development in taking a new path for hydropower development which is particularly Chinese in character. The concrete reasons are as follows:

1. Hydropower energy resources are a renewable primary energy resource. Like coal, petroleum, natural gas, and so on, hydropower is an integral part of primary energy resources. It is extremely important that this point be understood because it is the basic starting point for solving our hydropower development problems. Thus, the state should place hydropower at a level equal to coal, petroleum, natural gas, and so on for further consideration in the areas of energy resource policies, investment allocation, and management systems. The facts have proven that the administrative management pattern of corporations in reform of China's economic system which mainly involves substituting economic measures for the administrative organs of the past to organize the entire production and management process for coal and petroleum has been effective. Thus, it can be considered that establishing a hydropower development corporation to be responsible for hydropower development tasks in China is entirely reasonable.

2. Hydropower is a capital-intensive industry and large and medium-scale hydropower stations require substantial investments. A single project frequently requires several 100 million yuan, most require over 1 billion or several billion, and only one project can be under construction each year. The source of this large amount of capital depended entirely on state allocations in the past, and now, although there are more investment channels, the state still must allocate a substantial amount of capital as a basis for capital raising. Otherwise, it would be hard for localities to assume full responsibility. On the other hand, establishing a hydropower development corporation would permit more unified raising, allocation, regulation, and rational utilization of capital for investing capital into various projects according to location and time according to the needs of hydropower construction during different stages and the needs of rational construction schedules.

3. The construction schedules for hydropower stations are rather long. It usually takes 3 to 5 years to build a medium-sized hydropower station but it often takes about 10 years to complete a large hydropower station and generate electricity. These long schedules go beyond the planning year limits in 5-year plans. Without a special organ for planning, it is hard for the state and localities to deal with them in the formulation of 5-year plans. Moreover, the economic benefits of hydropower are often fully revealed only through long-term analysis or in evaluation of an entire industry, so it is easy for people to neglect or be affected by short-term behavior. However, establishing a hydropower development corporation would benefit the overall development needs of the national economy and the concrete requirements of 5-year plans by making the corresponding 5-year plans for hydropower development and including them in the sequence of state 5-year plans for concrete integration of long-term planning with capital raising, design, construction, and so on to assure smooth progress in hydropower construction.

4. Hydropower construction usually requires building a dam and reservoir, so it faces the problem of population resettlement and flooding land. Hydropower construction often can have different effects on and bring different benefits to different regions and different departments during the construction period and after startup

and power generation. There is an extremely delicate relationship of interests between them which can cause conflicts of interests and divided opinions. In this type of situation, the problem sometimes cannot be solved merely by relying on the relevant regions and departments for self-regulation, whereas a hydropower development corporation could serve as a leading unit focused on the interests of the state while also considering the interests of localities and departments to allocate inputs according to the benefits obtained and thereby coordinate the economic relationships of all parties and avoid endless disputes, unify ideology, and concentrate manpower, materials, and finances for good hydropower development.

5. Most hydraulic engineering structures involved in hydropower construction are large permanent structures and good ones can provide benefits over many years from a single investment. Poor structures can waste enormous financial and material resources and can even cause irrecoverable losses to the people's lives and property. It is precisely for this reason that the demands placed on preparatory survey and design work for hydropower construction are especially high. Mistakes in policy decisions are the greatest mistakes, and there are many experiences and lessons in hydropower construction in this area. Still, it is hard to ensure funds for preparatory work for hydropower in China now, work deployments are not made, and design reserves are seriously inadequate. This situation inevitably will directly affect the level of policy making and the scale of construction starts, so preparatory work has become the most prominent weak link in hydropower construction. To achieve the development goals for hydropower for the year 2000, we must greatly increase design reserves and expand the scale of preparatory work. For this purpose, we must establish a hydropower development fund for unified control, allocation, and utilization by the hydropower development corporation to enable more design reserves for hydropower development, provide a greater range of optimum choices for policy making, and assure sustained development of hydropower construction.

In summary, we can see that establishing a hydropower development corporation is an objective requirement suggested by the properties and characteristics of hydropower construction itself. It is both necessary and urgent that we establish this type of organ. Hydropower planning, surveying, design, administration, and management are handled separately by four or five departments of the state at the present time, and authority is overly decentralized. This has caused the overall process of hydropower construction, which originally had close internal relationships, to become disjointed. In this type of situation, if the next units responsible for survey, design, and construction encounter problems, they must send people to report to administrative departments at different higher levels to seek resolution. With relevant departments making the corresponding assignments, such comprehensive and multi-departmental questions cannot be solved quickly. For these projects, the conflict of divisions below (localities) and separation above can cause repeated project delays and make smooth progress impossible. Thus, the cause of hydropower construction urgently requires that we change this situation of "a host of dragons without a head."

The hydropower development corporation should be an economic body whose basic properties and functions are similar overall to the State Petroleum and Coal Development Corporation. Its main task is to implement fully industry responsibility for hydropower in China and take responsibility for tasks to develop large and medium-scale hydropower stations in China, mainly by adopting economic measures to implement full industry management for the entire hydropower production process, including planning, survey, design, construction, installation, operation, administration, and scientific research. Hydropower development companies can be established at various levels below the corporation on the basis of river basins or regions, and we can establish various types of joint venture companies and joint investment companies for joint management, for example, of aluminum and power, sulfur and power, nonferrous metals and hydropower, and so on. Economically, the corporation and its subsidiaries can practice independent accounting, but they should have specific regulation and control relationships. The corporation should serve its subsidiaries at all levels in planning guidance, in financial and material support, and in technology. The relationship of the hydropower development corporation and its subsidiaries to power grids has a prerequisite of an economic contract relationship for buying and selling power in unified grid dispatching. Employ the basic principles of the law of value in a commodity economy to deal with these interrelationships and make full use of the role that hydropower should play in a power grid.

III. Conclusion

"It takes more than a day for a river to freeze 3 feet deep." Structural problems do not form in a short time period, nor can a problem in an economic structure be eliminated soon after it appears. Work to readjust the economic structure cannot be completed with urgency nor can we attempt nothing and accomplish nothing. Readjustments should be made gradually and in steps. We should seize the opportunity now for the state to readjust the economic structure and quickly readjust the structure of the electric power industry. On the basis of feeling out the present situation and scientific projections, we should formulate a program to readjust the structure of the electric power industry and revise short-term plans to develop thermal power and hydropower. We also should establish a hydropower development corporation to push hydropower construction forward and assure smooth completion of work to readjust the structure of the electric power industry. Of course, establishing a hydropower development corporation will involve extremely important and concrete work and it

cannot be solved by writing a single article. The properties, duties, authority, tasks, structural configuration, personnel arrangements, and so on should be debated in comprehensive and earnest research. We have programs to readjust the structure of the electric power industry and hydropower development plans which have been examined, and we have a strong and effective organizational structure to implement them. I believe that substantial accomplishments certainly will be made in hydropower construction and that we can combine a major effort to develop the electric power industry to effectively reduce pressures on coal production and transport and thereby guarantee the health of the national economy and develop forward at a sustained and rather rapid pace.

Accelerating Construction of Small-Scale Stations

40130104c Beijing RENMIN RIBAO in Chinese 25 May 89 p 1

[Article by Xiao Junxi [5618 0193 3556]: "Accelerating Construction of Rural Small-Scale Hydropower Stations"]

[Text] The Ministry of Water Resources [has concluded] a workshop on rural hydropower to finalize a plan to accelerate the construction of rural small-scale hydropower plants.

China has abundant rural hydropower resources with 142,000,000 kilowatts to be developed. Since the economic reform, rural power stations have been built rapidly. As of the end of last year, 819 counties in China are relying on small-scale hydropower stations for electricity, covering approximately one-third of the administrative region, 5,600,000 square kilometers, 300,000,000 people and 300,000,000 mu of farm land.

However, power shortage is still a very serious problem in rural China. The amount of power available is very limited. There are at least 29 counties without electricity. Nearly one-fourth of the population has no electricity. In order to rectify this situation as soon as possible, the Ministry of Water Resources recently held a workshop on hydropower to summarize our experience. It is believed that this problem will not be solved in the near term by large nationwide power grids, especially in remote areas. These areas usually are rich in hydropower resources. It is not only necessary but also feasible to develop these low capital regenerative energy sources which do not require any fuel and transportation capacity. Based on the plan, we will add 700,000 kilowatts in power generating capacity per year in the next 3 years to electrify 100 test points. In the Eighth 5-Year Plan, we will build another 200 test points. By the end of the century, a total of 600 preliminarily electrified counties will be built.

Sichuan Could Become Major Hydropower Base

40130110a Chengdu SICHUAN RIBAO in Chinese 27 May 89 p 1

[Article by reporter Zhao Jian [6392 1017]: "Experts Say Sichuan Province's Hydropower Energy Resources Are Among the World's Largest, Could Be Built Into a Key National Hydropower Energy Resource Base Area"]

[Text] A comprehensive demonstration conference to inspect the "three rivers" [Jinsha Jiang, Yalong Jiang, and Dadu He] was held in Chengdu, and some experts in the inspection group consider Sichuan to be one of the world's few regions with a high concentration of hydropower resources. The experts proposed that the state build a powerful hydropower energy resource base area in Sichuan.

Beginning 20 April 1989, the "Three Rivers" Inspection Group, with former State Planning Commission Vice Chairman Lin Hua [2651 5478] as group chairman, China International Engineering Consulting Company assistant general manager and renowned hydropower specialist Luo Xibei [5013 6007 0554] and Sichuan Provincial Vice Governor Ma Lin [7456 7792], and others as deputy group directors made a comprehensive inspection of the Jinsha Jiang, Yalong Jiang, and Dadu He basins and some sections of the Min Jiang and Jialing Jiang. Most experts in the inspection group have inspected the upper reaches of the Huang He, Wu Jiang, and Lancang Jiang over the past few years. After inspecting the "three rivers" in west Sichuan, the feeling of nearly all the experts was that there are too many sites in Sichuan where large hydropower stations could be built, which has dazzled people with so many beautiful things that they simply cannot take them all in.

Data show that Sichuan has 91.66 million kW in developable hydropower resources (the "three rivers" account for 70 million kW) and could generate 500 billion kWh of electricity yearly, equivalent to 250 to 300 million tons of coal. However, just 3 percent of Sichuan's hydropower resources have been developed up to now. "Surging river water flows east, but the flow is actually coal and oil."

"Seeing something once is better than hearing about it 100 times." The enormous hydropower resources and economic potential of abundant mineral, agricultural, and forest ecological resources in the "three rivers" region left a deep impression on the experts. Officials in some national scientific research, planning, and design units indicated that the "three rivers" region should be the focus of scientific research and inputs of capital and manpower in the future. Given Sichuan's severe power shortage, the experts proposed pertinent opinions and suggestions for developing "three rivers" hydropower. The main ones were: 1) Face up to the reality of Sichuan's energy resource configuration, unwaveringly base development principles for Sichuan's energy resources on hydropower, and be unflinching. 2) Reform the hydropower construction system and establish a

river basin development company for rolling development of capital. 3) Do good planning and design preparations for hydropower beforehand. 4) Some experts pointed out that, like construction of the Shanxi Coal and Energy Resource Base Area, the state should establish China's largest hydropower resource base area in west Sichuan and use ultrahigh voltage power transmission lines to "transmit power from west China to east China."

It was learned that achievements in this inspection and debate will be written into a report by Lin Hua, Luo Xibei, and other well-known people for submission to central policymaking organs.

Sichuan Decides To Develop 'Three Rivers' Scheme

40130104d Beijing RENMIN RIBAO in Chinese 25 May 89 p 1

[Article by Li Zhengjie [2621 2973 2638] and Ling Yun [0407 0061]: "Sichuan Decides To Develop 'Three Rivers' Water Resources"]

[Text] Based on scientific evidence and experts' opinions, Sichuan has decided to develop the "three rivers" water resources of the Jinsha Jiang, Dadu He, and Yalong Jiang in order to stabilize industrial and agricultural development to revitalize its economy.

In order to formulate a scientific and feasible scheme to develop hydropower, the provincial government of Sichuan invited dozens of experts in hydropower, geology, water conservation, economics, chemical industry, agriculture and ecology to conduct a comprehensive survey of the "three rivers" area.

From 18 April to 24 May, experts traveled over 5,000 kilometers over the mountains and across rivers, surveyed more than a dozen rivers, including the Jinsha Jiang, Dadu He, Yalong Jiang, Min Jiang, Jialing Jiang, etc., and inspected close to 20 dam sites where large-scale power stations have been, are being, and will be constructed in order to understand the local mining, industry, agriculture and ecology situation. Based on the evidence obtained in the survey, experts believe Sichuan is uniquely abundant in water resources. The theoretical energy reserve is 150,000,000 kilowatts. The "three rivers" region is the most concentrated area. The river drop is great, and the flow is steady, a rare condition. The ratio of Sichuan's energy structure shows 19 percent coal, 1.2 percent natural gas, 0.1 percent petroleum and the majority - - 71.7 percent—hydropower. Thus, the major direction in Sichuan is to develop hydropower.

Experts point out that there are not only several good dam sites for large-scale power plants but also numerous suitable sites for small-scale hydropower stations. They suggest a guideline which includes the development of key large-scale hydropower plants and small-scale hydropower stations. Especially in the next several years, we should support and encourage local people to build a number of low capital power stations in order to implement the policy of self-sufficiency and to provide relief due to the current power shortage.

Rapid Development of Medium, Small-Scale Hydropower in Sichuan

40130105b Beijing RENMIN RIBAO (OVERSEAS EDITION) in Chinese 24 May 89 p 3

[Article by reporters Li Zhengjie [2621 2973 0267] and Ling Yun [0407 0061]: "Medium and Small-Scale Hydropower Developing Rapidly in Sichuan; Over 6 Billion kWh of Power Produced Yearly"]

[Text] "Those who develop power should receive the benefits." Sichuan has implemented policies of using power to develop power and rolling development to motivate local initiative to develop power, and small-scale hydropower has grown rapidly. The installed generating capacity at medium and small-scale hydropower stations in Sichuan Province has now reached 1.53 million kW and they produce 6.138 billion kWh of power yearly, leaping to first place in China.

Sichuan Province has extremely abundant hydropower resources in over 1,160 big and small river basins and innumerable small tributaries and canals. The yearly runoff is 450.8 billion m^3, nine times the amount of water in the Huang He, so it has enormous hydropower development advantages. To make full use of its natural advantages, Sichuan implemented a power development model over the past few years of "many parties developing power, combining large, medium, and small-scale development, self-construction, self-management, and self-use." They stipulated that all profits earned by local areas from building power stations should be retained by the localities to develop new power stations. This sort of "snowballing" power development model has substantially increased the number of small hydropower stations built by localities throughout Sichuan and the capital used for the purpose of using power to develop power each year has reached 29.1 million yuan.

Statistics show that Sichuan's prefectures, autonomous prefectures, counties, and townships invested 200 million yuan in 1985 to develop power and nearly doubled this amount in 1986 to 370 million yuan. It grew again to more than 500 million yuan in 1987 and over 700 million yuan in 1988. Nearly 200,000 kW in hydropower has gone into operation annually in Sichuan for the past 4 years. The installed generating capacity at local hydropower stations now accounts for 27.3 percent of Sichuan's total installed generating capacity and there are 130 counties in the province which now depend mainly on hydropower for electricity supplies. Hydropower stations with an installed generating capacity of 670,000 kW are now under construction and will be completed and go into operation over the next 3 years.

The initiative of peasants who benefit from local hydropower development to develop power continues to

grow, and the total installed generating capacity in power stations they have raised the funds to build on streams, rivers, and canals has reached 700,000 kW, equal to nearly one-half of total local hydropower.

Now, all of Sichuan Province's counties, 95 percent of its townships, 83 percent of its villages, and 69 percent of its peasant households have electricity.

Plan To Promote Small-Scale Hydropower in Southeast Proposed

40130105a Beijing KEJI RIBAO in Chinese 11 May 89 p 1

[Article: "Yang Jike [2799 4764 3784] and Others Propose Building Small-Scale Hydropower in Seven Southeast Provinces"]

[Text] Editorial department:

Energy is an issue which concerns and troubles everyone, and the related Three Gorges Key Water Conservancy Project has become a controversial topic. Vice Premier Yao Yilin [1202 0181 2651] recently stated clearly that "the Three Gorges Project cannot get under way within the next 5 years." How, then, can we deal with the extreme urgency of China's electric power shortage? Some National People's Congress [NPC] members from seven southeast provinces including NPC Standing Committee member Yang Jike and others proposed that "we not debate a single especially large project endlessly, but instead substitute dealing with concrete matters relating to work for discussions of principles or ideological guidelines, and turn controversy into cooperation." They proposed to the NPC that "in a situation of steadily growing power shortages, full construction of small-scale hydropower in old revolutionary base areas and poor areas of seven southeast provinces can provide many times the benefits for the same amount of effort."

Based on full survey research, Yang Jike and other delegates suggested that China has many widely distributed hydropower resource reserves. China has 1,104 counties with over 10,000 kW in developable small-scale hydropower resources. There are 14 million kW of undeveloped small-scale hydropower resources in old revolutionary base areas and mountainous areas of the seven provinces Jiangxi, Hunan, Guangdong, Fujian, Zhejiang, Hainan, and Anhui. They equal the electric power resources of the Three Gorges Project.

Yang Jike and other delegates feel that there are 10 major advantages to small-scale hydropower construction in seven southeast provinces over the next 10 years. 1) State finances can handle it. Small hydropower station construction can motivate the initiative of local areas to invest in energy resources. For small-scale hydropower projects with a total installed generating capacity of 14 million kW in mountainous regions of seven southeast provinces, the state would simply have to permit them to float electricity prices via market regulation and allocate some investments each year during the first 5 years to aid local areas in making a start. Afterwards, they would merely have to allow them to use power to develop power and develop through their own efforts. 2) Building a large number of small reservoirs and small hydropower stations could solve society's surplus labor problems and provide many employment opportunities. After the big depression, the United States used major construction of hydropower stations and highways during the 1930's to solve severe workers' unemployment problems at the time. 3) Building small reservoirs and small hydropower stations takes up little land and most of them are in sparsely populated regions, so population resettlement problems basically can be avoided. 4) Building a small hydropower station takes 10 to 20 years less than building an especially large hydropower station, and they can begin operating within 3 years at the most. 5) Construction expenses for long-distance ultrahigh voltage power transmission and transformation lines and power losses can be avoided completely. China's main energy supplying regions are located in west China while power using industries are located in east China, so transmitting western power to east China is the current situation. Widespread construction of small hydropower stations in energy short regions of our seven southeastern provinces would allow us to avoid completely the investment to build ultrahigh voltage power transmission and transformation lines to transmit power from west to east China. 6) There are many old revolutionary base areas, minority areas, frontier areas, and poor areas in our seven southeastern provinces and they are rich in mountain resources, but most local products are shipped out of the region in the form of raw materials. Systematic development and a shift from manual processing to semi-automated and semi-electrified processing would bring prosperity to mountainous regions. Now, however, in Hunan Province for example, about 60 percent of the peasants living in 77 counties rich in small-scale hydropower resources have no electricity. The situation is more or less the same in the six other provinces. 7) Semi-automated and semi-electrified processing industries at the county level and below can absorb large amounts of surplus labor, enabling them to leave the soil without leaving the village and to live and work in peace and contentment. 8) Reservoir and small-scale hydropower construction could be combined with multigoal development to increase the capacity of local farmland to resist drought and waterlogging. Enping County in Guangdong, for example, integrated control and development of the Mian Jiang river basin, developed 3.6 million kW in small-scale hydropower, diverted and lifted water to irrigate 280,000 mu of farmland, and eliminated the danger of flooding from 3.12 million mu of farmland. Moreover, if the peasants can use surplus electricity and electric power during the wet season for cooking and boiling water, firewood cutting by the peasants could be eliminated to protect the ecological environment. 9) It would benefit exports of small-scale hydropower prospecting, design, degugging, and other labor services and equipment. 10) Premier Li Peng proposed the "three selfs" principle of "self-construction, self-management, self-use" for small-scale

hydropower construction in China. Developing small-scale hydropower in our seven southeastern provinces could promote implementation of the "three selfs" principles and open up new paths for reform in the electric power industry management system.

Yang Jike and other delegates stated that the rate of growth in energy resource and electric power construction in the United States, Japan, the Soviet Union, and other nations exceeds the rate of growth in industrial construction by more than 20 percent. Since 1984, however, the average rate of growth in China has been just 60 percent of the rate of growth in industry. China is the world's richest nation in hydropower resources and we have been talking about "precedence for hydropower development for over 30 years." We can no longer expend our efforts on debating big and far-off hydropower projects. We hope that research on this entirely feasible strategy and system for small-scale hydropower construction in our seven southeastern provinces will lead to a path which will quell the controversy for cooperative advance.

We hope that the obvious significance of the proposals by Yang Jike and other delegates for solving the electric power shortage will be noted in all areas.

Heavy Silting Threatens Showcase Guizhou Hydropower Station

40130108b Beijing GUANGMING RIBAO in Chinese 17 May 89 p 2

[Article by reporter Dai Xuanchang [2071 1357 7022]: "Serious Silt Accumulation at Wujiangdu Hydropower Station; Experts Call for Urgent Control Measures"]

[Text] Editorial department:

During the first quarter of 1989, the Guizhou Provincial Science Association organized experts in hydropower, soils, soil conservation, forestry, ecology, agronomy, and other fields to make an on-site inspection of the Wujiangdu hydropower station. The experts discovered serious silt accumulation at the station. They called on relevant departments to adopt urgent measures to protect the reservoir and power station.

The Wujiangdu hydropower station is located on the upper reaches of the trunk of the Wu Jiang, and is one of China's largest hydropower stations built in a limestone region. The big dam at the power station is an arched gravity dam. The dam is 165 m high, 395 m long at the top and 112 m wide at the base. The power station has three turbine generators, a total installed generating capacity of 630,000 kW, and produces 3.34 billion kWh of power annually. It is the main power station in the Southeast China Grid. The power station has been operating for 9 years and has made a significant contribution to social development in these areas.

However, there has been severe cutting of the formerly sparse forests and vegetation over the past few years within the reservoir basin, a large amount of soil has eroded away from cultivated slopes, and silt from tributary regions like the Liuchong He, Sancha He, and others has flown continually into the reservoir, causing 180 million m^3 of silt, about 270 million tons, to accumulate in the reservoir. The silt has accumulated to an elevation of 660 m, equivalent to the elevation of silt accumulation after 100 years. Thus, the two industrial and household outlets at elevations of 645 and 655 m have become blocked by silt. Only 5 m remains for the silt to build up to the last outlet at an elevation of 665 m, and it has been projected that it likewise will be blocked by silt within 5 to 7 years if it is not dealt with. The power station could not operate and generate power at that time.

Given the severe silt blockage situation at present at the Wujiangdu hydropower station, the experts undertook earnest analytical research and proposed five measures for improvement.

1. Legislation. This is the root of protecting the Wujiangdu hydropower station. Hydropower, forestry, agriculture, environment, and other relevant departments should jointly study and formulate concrete measures for ecological construction to protect the area around the power station, and they should be made firm in the form of laws and regulations, with legal responsibility sought for those who violate the regulations.

2. An unconditional end to cultivation to permit cultivated slopes of 35 degrees or more in the upper reaches of the Wujiangdu hydropower station reservoir region to revert to forests and grassland, and terracing of slopes or decultivation and reversion to forest within a short time for cultivated slopes between 25 and 34 degrees. Barren mountains suited to afforestation within the reservoir region should be selectively planted in trees and grass to accelerate coverage by vegetation and gradually control soil erosion.

3. The Wujiangdu hydropower station and relevant scientific research departments should focus on developing water for use in cooling water turbine generators and research on other water sources.

4. Take preventive measures. I propose that the relevant departments immediately adopt urgent and effective measures toward yellow cliffs, ponds, and so on which are indications of landslides to prevent the occurrence of landslides.

5. Conscientiously study the advantages of submerged sealed plant buildings and tailwater processing, handle problems like the relations between power stations and nearby peasants, and so on.

Yunnan's Hydropower Construction Spurs Development of Entire Lancang Jiang Basin

40130108a Shanghai WENHUI BAO in Chinese 22 May 89 p 1

[Article by reporter Pu Jianping [3184 1696 1627]: "Lancang Jiang Water Should Be 'Cut in Half' To Develop a Hydropower 'Motherlode'—Yunnan Raises Curtain on Using Hydropower Construction To Spur Development of Lancang Jiang Basin Resources; Pouring of Dam Now Under Way at Big Manwan Power

Station"]

[Text] The curtain has now opened on hydropower construction to spur development of the resource treasurehouse in the Lancang Jiang Basin. At Manwan Power Station, the Lancang Jiang's first large capacity cascade hydropower station with a design installed generating capacity of 1.5 million kW, the flow of the Lancang Jiang was diverted ahead of schedule and pouring of the large dam has begun.

Yunnan Province is second in China in developable hydropower resources, concentrated mainly on the Jinsha Jiang, Lancang Jiang, and Nu Jiang. Among them, the Lancang Jiang has superior development conditions. It flows from plateau and mountain snows toward a tropical dam over a distance of 1,240 km across Yunnan Province. The southern outlet enters the Megong He, and the drop is 1,780 m. It is one of China's few hydropower "motherlodes." Diverting the flow of the Lancang Jiang to generate power has obvious advantages: there is an ample and stable amount of water, only small yearly variations in runoff, and high guaranteed power station output. The topographic and geographic conditions are excellent, the rock quality is good, the alluviation layer is shallow, and the amount of engineering required small. The average investment per 10,000 kW for land inundation, population resettlement, and several other items is far lower than average levels for large hydropower stations already completed or under construction in China. It would be best now to develop the middle and lower reaches from Gongguo Bridge to the mouth of the river at Nan'e for a distance of 800 km and a drop of 822 m. The plan is to build eight cascade power stations at Gongguo Bridge, Xiaowan, Manwan, Dachao Shan, Nuozhadu, Jinghong, Ganlanba, and the Nan'e river mouth and two large regulating reservoirs at Xiaowan and Nuozhadu. The total installed generating capacity will be 13.7 million kW and the yearly power output could exceed 70 billion kWh.

Yunnan Provincial Governor He Zhiqiang [0735 1807 1730] pointed out that comprehensive development of the Lancang Jiang basin involves magnificent systems engineering and cannot depend on Yunnan Province's own forces. They warmly welcome fraternal provinces and cities, compatriots in Hong Kong and Macao, and foreign friends for investing and cooperative development. Yunnan recently reached agreement with Guangdong Province, the Ministry of Energy Resources, and the State Energy Resource Investment Company for cooperative development of Lancang Jiang hydropower and transmission of power to Guangdong. They are now preparing for overall cooperation with Shanghai for joint development of Yunnan's energy resources.

To strengthen the self-development capacity of Lancang Jiang hydropower stations and reduce state investments, several well-known people in economic circles have proposed reforming the electric power construction system and organizing a Lancang Jiang Hydropower Development Company to use the income from existing power stations and those under construction after they go into operation as a basis for accumulation to build a power station at the next cascade step in a rolling fashion for sustained cascade development.

Development of the Lancang Jiang basin, particularly hydropower development, is the key step for resource development for Yunnan as a whole. For this reason, Yunnan Province proposed the principle of "integrating mines and power, moving forward first with power, opening up to the outside, and comprehensive development" for full development of the abundant water power, mine product, and tropical crop resources in the Lancang Jiang basin.

Massive Blast Near Wujiangdu Power Station

40130104b Shanghai JIEFANG RIBAO in Chinese 4 May 89 p 3

[Article by Xinhua News Agency from Guiyang on 3 May: "Explosion at Wujiangdu Hydropower Station; 28 Dead and Loss Estimated at 200,000 Yuan"]

[Text] A massive explosion occurred at Wujiangdu hydropower station as workers tried to clear a dangerous cliff in the area. The victims were dug out on 1 May. Twenty-eight people were killed and 16 injured.

The incident took place on 26 April when workers tried to blast off the cliff near the Wujiangdu hydropower station. The cause of the explosion remains to be investigated. After the incident, officials were dispatched by the relevant departments in Guizhou to direct the rescue effort at the scene.

The direct loss from the incident was estimated to be 200,000 yuan.

Expansion of Jilin Co-Generation Plant Completed

40100062c Beijing XINHUA in English 1203 GMT 21 Jul 89

[Text] Changchun, July 21 (XINHUA)—The construction of the Jilin thermal power plant—the largest heat and power [co-generation] enterprise in China—was recently completed.

So far, the plant has 15 coal-burning furnaces and 11 turbogenerators. With a total generating capacity of 850,000 kilowatts, the plant produces 6.5 billion kWh and 21,650 billion kilojoules annually.

The plant was one of the major projects in China's First Five-Year Plan period (1953-1957). Its first-stage construction started in 1955 and the first unit of generators with a capacity of 25,000 kilowatts was put into production in the following year.

Since then, the plant has produced a total of 1,202.9 billion kWh of power and 133,940 billion kilojoules of heat, making great contributions to the country.

In order to increase the production capacity, the plant updated the major facilities in the 1970's and expanded the capacity of the existing nine generators from the original 450,000 to 550,000 kilowatts.

The plant directly provides electricity to a number of key state-run enterprises, including the Jilin Chemical Industrial Corporation, the Jilin Paper Mill and the Jilin Cement Factory.

The heat is sent to 32 large enterprises located within 5 kilometers of the plant and it also warms 2.35 million square meters of residential housing in the winter.

Baima Plant Adds New Generators

40130115b Chengdu SICHUAN RIBAO in Chinese 18 May 89 p 1

[Text] Work on the water circulation system project of the Baima power plant's new 2x200,000 kilowatt generating sets was completed ahead of schedule on the 15th. The No 2 unit was already generating power to the grid at 1500 hours on that date.

Through concerted effort, cooperation and 9 days and nights of struggle by the No 3 Provincial Power Construction Company, the Ministry of Communications' No 2 Navigation Company, the Baima Power Plant's Baima Project Construction Office, the Southwest Institute of Electric Power Design of the Ministry of Water Resources and other organizations, three major difficulties involving the flow diversion channel between the filter screens, the sand screen installed underwater on the intake head, and the gravel backfill were successively overcome. Work was completed 43 hours earlier than required by the provincial government's on-site Baima work conference. This has received the commendation of the Provincial People's Government.

Jiangyou Expansion Project Proceeding Smoothly

40130120a Chengdu SICHUAN RIBAO in Chinese 19 Jun 89 p 1

[Excerpt] [Passage omitted] Formal construction at the Jiangyou Power Plant expansion project began on 1 October 1987 and the first generator will produce power at the end of 1989. A complete set of equipment required for this project was imported from France. Ten senior engineers from the Southwest China Electric Power Design Academy led the way in establishing a responsible company to implement overall responsibility for organizing construction. They organized during construction and worked together very well with French experts, and the project has proceeded smoothly as a result. Some 44 percent of the total yearly investment was completed between January and May of 1989.

Now, the 200-plus m tall smokestack and 120 m tall cooling tower are finished and the entire project is entering the installation stage. All of the main No 7 generator plant building and steam building have been delivered and installed and some equipment is now in place. Civil engineering for the No 8 boiler and the water cutoff for the steam building were completed ahead of plan. The construction schedule may be about 2 months less than the No 7 generator. [passage omitted]

Coal Production Statistics Released

40100066a Beijing XINHUA in English 0723 GMT 22 Aug 89

["Fact and Figures: Coal Industry"—XINHUA headline; "First of a Series About China's Biggest and Newest Enterprises and Projects"]

[Text] Beijing, August 22 (XINHUA)—The Datong coal field in Shanxi Province is the largest of its kind in China, with an annual capacity of 23.5 million tons and reserves of 37.5 billion tons.

The biggest coal mines in China include the Xinglongzhuang and Baodian mines in Yanzhou County, Shandong Province, Panji No. 1 mine in Huainan, Jiangsu Province, and Xiqu mine in Gujiao, Shanxi Province. Each of these mines has an annual capacity of 3 million tons.

The Antaibao open-cut coal mine located in the Pingshuo coal field in Shanxi Province is the biggest of its kind in China. It was put into operation in 1987, and has an annual capacity of 15 million tons.

The biggest coal washeries in China include the Xinglongzhuang washery in Yanzhou, the washery of Yangquan No. 1 coal mine, Shanxi Province, the washery of Panji No. 1 coal mine in Huainan, Jiangsu Province, and Xiqu washery in the Gujiao coal field in Shanxi Province. Each of them has a capacity of 3 million tons.

China has managed to increase its annual coal production from 32.4 million tons in 1949 to 979 million tons in 1988, which makes it the second-biggest producer in the world.

It is estimated that China will produce more than 1 billion tons of coal this year.

Coal Output Continues To Grow

40130099c Beijing RENMIN RIBAO in Chinese 12 May 89 p 1

[Article by reporter Liu Xieyang [0491 3610 7122]: "Momentum of Increasing Coal Production Continues Without Letup—Output Exceeds Quotas by 14.03 Million Tons in First 4 Months of 1989"]

[Text] I learned from the Ministry of Energy Resources that in a situation of 7 consecutive years of sustained growth in coal output in China, excellent momentum has been sustained through the first 4 months of 1989.

Coal production in China has grown in a stable manner over the past several years. Output is up more than 300 million tons over the 10-year period between 1983 and 1987 [as published], growing at an average yearly rate of 35 million tons.

From January to April 1989, in a situation of raw materials shortages and inadequate supplies of electric power, coal production totaled 298 million tons and exceeded quotas by 14.03 million tons, with output up by 6.7 percent over the same period in 1988.

Promoting the Growth of Small-Scale Mining Operations in Sichuan

40130117c Chengdu SICHUAN RIBAO in Chinese 7 Jun 89 p 2

[Article by Zhang Chi [1728 7459] and Sun Jianming [1327 1696 0730]: "How To Promote the Development of Small-Scale Local Coal Mines"]

[Text] Sichuan has more than 8,700 small-scale local coal mines which are spread over 120 coal-producing counties. They produced 47.8 percent of the coal mined in Sichuan last year. All the coal consumed by local industries and rural population and more than one-half of the coal used in urban areas came from these mines. Based on statistics, it only took an investment of some 3 yuan to produce an additional ton of coal between 1981 and 1985. This is much lower than the investment per ton in that same period by the national coal mines. These local small-scale coal mines are making a significant contribution to the economy and everyday life in Sichuan.

Some comrades do not seem to understand the significance and contribution of these local mines. They fail to support these mines; this causes some difficulties. For instance, coal could not be shipped in some areas.

We must admit that local mines usually use outdated equipment and technology.

However, after 10 years of effort, the situation has changed. There are over 2,800 better equipped, safe mines. The number of injuries decreased last year compared to a few years before. In terms of utilization of resources, some small-scale mines do indeed waste resources by digging without a plan. However, speaking in general, rational development of local small-scale mines fully utilizes the limited coal resources in Sichuan. Based on a survey, we produced 22,880,000 tons of coal from 13 key areas in 1988. Some 11,020,000 tons of the coal came from thin coal layers that the central government cannot mine and 2,180,000 tons was residual coal mined from national mines. The two combined accounted for 57.7 percent of the total amount. In view of the fact that the coal resources in Sichuan are relatively poor, this kind of utilization ought to be encouraged. It is projected that Sichuan will have a shortage of 25,000,000 tons of coal by the end of the century. It is unrealistic to import all of it from other provinces; the solution must come from within the province. We have to motivate both national and local coal mines and take advantage of the low capital requirement and fast results of local small-scale coal mines to set a policy to support them.

First, we should distribute the resources based on the mineral resources law. The coal resources in Sichuan are small and scattered. There are numerous locations, and there are many exposed thin coal layers. Large-scale

exploration is not economically feasible in a considerable number of areas. However, it is suitable for local small-scale mining. The total coal reserves in Sichuan are 1 billion tons, and they are mostly widely scattered. It is suggested that the relevant department should distribute the resources according to the mineral resources law and define the areas to be mined; this would solve the problem of lack of resource at local mines. This may be beneficial to the resource utilization plan.

Next, we should make sure that the government follows through in the delivery of financial and material support. The government spends a certain amount of money on local coal mines and a portion of it should be spent on small-scale mines. It was specified by the province that 20 percent of the energy and transportation development fund should be spent on small-scale local mines. It was reduced to 5 percent in the past 2 years. We should consider returning it to the original proportion. The loan department may wish to consider resuming loans to small-scale mines. When villages manage to raise the funds necessary to develop a local mine, we should encourage them. Any government allocation of steel and lumber should be strictly carried out and directly delivered to the coal mine to prevent illegal borrowing.

Furthermore, we should assist them in transportation and sales. There are numerous mines, mostly scattered in the mountains, and transportation is a major problem. Whether it is appropriate and meets market demand to require the provincial government to approve the shipment of coal from a small-scale mine out of the province should be studied. A more flexible approach may be adopted to authorize the business departments of the local small-scale mines to approve the shipment of coal out of the area to facilitate its transport.

Finally, the present management system for a local small-scale mine was established in 1979 after the Third Plenum of the 11th Party Congress. It meets the needs in the development of local mines. To sustain the growth of coal mine development, we should further stabilize and perfect the existing system to ensure that management and service functions remain normal. In the meantime, small-scale local mines must be closely monitored to prevent and firmly prohibit unplanned and unauthorized digging. The mine shafts must be laid out and built scientifically. We must insist on safety first and spend the accumulated capital on promoting technical progress to rebuild the mine and to improve their technical and management standards and economical benefits.

Shanxi Rural Coal Mines Make Important Contribution

40100062b Beijing XINHUA in English 1145 GMT 22 Jul 89

[Excerpt] Taiyuan, July 22 (XINHUA)—Rural coal mines in north China's Shanxi Province have played an important role in China's coal production, according to a local official.

Li Menggeng, deputy director of the provincial coal bureau, said that Shanxi, the largest coal producer in China, produced 240 million tons of coal last year or one-quarter of China's total coal output, of which rural coal mines produced 42.4 percent.

In the first 6 months of this year, rural coal mines in Shanxi turned out 45.43 million tons of coal, accounting for 43 percent of the province's total output.

Rural coal mines mean mines set up and operated by rural collectives or individuals without state investment. Generally, they need less investment and shorter construction period, yield returns faster, and have higher efficiency and lower cost.

The rural coal mines in Shanxi Province have developed rapidly in recent years. Now the province has 6,300 rural coal mines, 4,500 more than in 1978 when the output of rural coal mines accounted for only 17.1 percent of the province's output.

Rural coal mines have also played an important role in alleviating the strain of coal supply in China. Over the last 10 years, the rural coal mines turned out 643 million tons of coal, one-third of which were shipped to other parts of the country or for export.

With development of rural coal mines, local peasants have become prosperous as well. The rural coal mines yielded a total of 7.2 billion yuan (about 1.9 billion U.S. dollars) in the last 10 years and local peasants also earned 4.6 billion yuan (1.2 billion U.S. dollars) of freight through transport of coal, and the two items contributed 50 percent to peasants' income.

However, there are also some problems in the rural coal industry, including waste of resources, poor working conditions and lack of technology and personnel, Li said. [passage omitted]

First Phase of Large Jilin Mine Begins Operating

40100064a Beijing XINHUA in English 1354 GMT 1 Aug 89

[Text] Changchun, August 1 (XINHUA)—The Yangcaogou coal mine, the largest locality-run colliery in northeast China's Jilin Province, went into operation today, according to a local official.

With coal deposits of 250 million tons, the mine's coal bed is 5-6 meters thick.

The first phase project, which is under construction now, includes three mines with a design capacity of 360,000 tons per year. The design capacity in the second phase will be 600,000 tons per year, and in the third phase, the design capacity will be 1.56 million tons per year.

The No. 1 mine of the first phase project, which has gone into operation now, has an annual design capacity of 150,000 tons.

All the projects will be finished and go into operation in 1995.

Petroleum Output Figures for First 7 Months Published

40100066b Beijing CEI Database in English 17 Aug 89

[Text] Beijing (CEI)—Following is a table of the output of major oil and gas fields in China in the first 7 months of this year, released by the China Oil and Gas Exploration and Development Corporation:

Name of field	Oil (Unit: 10,000 tons)	Percentage of annual quota	Gas (Unit: Million c.m.)	Percentage of annual quota
Daqing	3229.9	58.3	12.93	58.8
Shengli	1905.8	55.2	8.83	60.9
Liaohe	746.9	56.2	9.70	57.1
Zhongyuan	401.9	54.2	8.55	68.4
Xinjiang	365.6	56.2	2.90	—
Huabei	313.3	57.5	1.20	52.3
Dagang	230.2	53.5	2.18	60.6
Jinin	197.7	61.2	0.60	—
Henan	149.2	58.5	0.31	—
Changqing	81.7	59.6	0.13	—
Jianghan	54.5	57.4	0.36	—
Jiangsu	44.2	63.1	0.20	—
Qinghai	41.5	59.3	0.22	—
Yumen	31.3	69.5	0.08	—
Sichuan	7.7	76.6	—	—
CNOOC	53.6	59.6	—	—

Note: CNOOC—China National Offshore Oil Corporation

Breakthrough in Petroleum Geological Prospecting

40130120c Beijing KEJI RIBAO in Chinese 6 Jul 89 p 1

[Article by KEJI RIBAO reporters Chen Dong [7115 2639] and Fan Li [5400 0500]: "First Combined Use of Pyrolytic Absorption, Thermal Cracking, Chromatic Mass Spectrometry, and Data Processing Is Major Breakthrough in Petroleum Geological Prospecting Techniques"]

[Text] Data obtained 3 hours after extracting a rock core (or crude oil, etc.) sample half the size of a grain of rice can accurately guide petroleum geological prospecting. This "fairy tale" was realized miraculously at Dagang oil field on 1 July 1989. This was the result of work on the world's first combined use of pyrolytic absorption, thermal cracking, chromatic mass spectrometry, and data processing, and it is a major breakthrough in petroleum geological prospecting techniques.

Advanced chromatographs and mass spectrometers have been rather widely used in China's petroleum geology prospecting over the past few years, but before doing chromatic and spectrographic analysis of rock samples, they must undergo complicated organic pre-processing which usually takes 1 to 2 weeks and consumes time and effort. Despite this, Yu Huasheng [0060 5478 5116] of the Beijing Service Center of the United States Finnegan Company, Jiang Shanchun [1203 0810 2504] of the Chinese Academy of Sciences Guangzhou New Geological Technologies Institute, Wang Zhongran [3769 1813 3544] of the Dagang Petroleum Management Bureau Geological Prospecting and Development Research Academy, and others finished installing and debugging this device. Because it boldly uses pyrolytic absorption (300°C) and thermal cracking (510°C) devices at advanced international levels of the 1980's in conjunction with a high performance ion trap mass spectrometer, it can rapidly obtain S_1 data which indicates hydrocarbon distributions and biological marker information, and it can provide concise indications of casein base (oil generation parent material) types I to III S_2 data on the spectral plot, which saves time and effort and prevents contamination. On-site analytical information which "moves with the drill bit" has enormous real importance for guiding geological prospecting, understanding the oil generation threshold, and diagnosing and locating oil pools. It not only fills in a blank space in China but is also the first instance worldwide. This device also can be widely used in biology, the environment, and the fermentation and perfume industries.

Only 7 months elapsed between the proposal of this project and its complete realization. The contract was examined quickly, materials were delivered quickly, installation went quickly, and it produced data quickly. With substantial support from the Ministry of Petroleum Industry, the relevant departments and S&T personnel fought every second and worked continually to open the box on 21 June 1989. The first group of data was produced on 23 June. In just 10 days they did oil generating rock, crude oil, chloroform bitumen "A," casein, and several other samples and obtained satisfying results. Estimates by relevant departments show that all the investments to import this device may be fully recovered within 1 year, so it has rather high economic and social results.

Tarim Oil Field Exploitation Begins

40130099d Beijing RENMIN RIBAO (OVERSEAS EDITION) in Chinese 13 May 89 p 1

[Article: "Curtain Opens on Exploitation of Big Tarim Oil Field, Tens of Geophysical Prospecting and Exploratory Drilling Teams Arrive at Site"]

[Text] The curtain has opened in the battle to exploit petroleum in the "cornucopia" of the Tarim Basin.

The Tarim Basin, located in Xinjiang, covers an area of 530,000 km^2 and is China's largest basin. Geological prospecting for oil and gas there have confirmed the existence of a huge oil province beneath Tarim Basin. The north Tarim Lunnan 2 well, where drilling began in November 1988, has discovered nine oil strata in the Paleozoic and test gushes have produced 682 m^3 of crude

oil and 110,000 m^3 of natural gas. The simultaneous oil output from these strata and high daily output are unprecedented in petroleum exploitation in China.

Several 10 geophysical prospecting teams and exploratory drilling teams from many large oil fields have now been transferred to the site and thousands of tons of drilling equipment and construction materials continue to arrive. A 500-km-long highway has been opened and two steel runways and a steel floating bridge have been built in the desert.

The next goal in the battle for exploration is to prove two new structures in the central part of the desert, establish the Yingmaili and Luntai base areas centered on the Lunnan 2 well, and build a production experiment region with an output capacity at a definite scale.

High-Yield Oil-Gas Well Drilled in Tarim Basin

40100067b Beijing XINHUA in English 1014 GMT 26 Aug 89

[Text] Urumqi, August 26 (XINHUA)—A drilling crew attached to the Northwest Petroleum and Geological Bureau under the Ministry of Geology and Mineral Resources has recently sunk a high-yield oil and gas well in the Tarim Basin in the Xinjiang Uygur Autonomous Region.

Located in the northern part of the basin, the well is estimated to have a daily capacity of 4.2 million cubic meters of gas and 1,400 cubic meters of light crude oil.

This is the third producing well drilled this year in the Tarim Basin.

State Council Approves Oil Projects for Inner Mongolia

40130120b Beijing JINGJI RIBAO in Chinese 12 Jun 89 p 2

[Article by Zhang Shiqing [1728 0013 1987]: "State Council Approves Construction of Three Petroleum Projects in Inner Mongolia"]

[Text] Three petroleum projects at the Erlian Arxan oil field, the Asai crude oil export pipeline, and the Huhhot oil refinery, key state construction projects involving a total investment of 1.74 billion yuan, received State Council approval recently and the State Planning Commission has established them as projects for full development and construction.

Arxan oil field is located in central Erlian Basin in Inner Mongolia. The first oil producing well in this region was drilled in September 1981. This was followed by discovery of four oil pools at Menggulin, Abei, A'nan, and Ha'nan which together are called the Arxan oil field. This oil field has been proven to have a petroliferous area covering 61.9 km^2 with reserves of 79.76 million tons.

To accelerate synchronous construction of the oil field, oil transmission, and oil refining projects, the North China Petroleum Management Bureau transferred an army of nearly 10,000 petroleum workers to the Inner Mongolia plain. Arxan oil field, with a yearly output scale of 1 million tons of crude oil, and the 378-km-long crude oil transmission pipeline from A'nan to Saihantala, originally scheduled for completion in 1992, may be completed 2 years ahead of schedule in 1990. Construction of the matching Huhhot oil refinery is to begin fully and it will be finished in its entirety and go into operation in 1992. This oil refinery will have a yearly crude oil processing capacity of 1 million tons and will produce 270,000 tons of gasoline, 337,000 tons of diesel, and 14,000 tons of liquified gas yearly.

Inner Mongolia Invests Heavily in Oil Projects

40130125 Beijing ZHONGGUO XINWEN SHE in Chinese 0642 GMT 23 Aug 89

[Report: "Inner Mongolia Invests Heavily in the Exploitation of Oil Resources"]

[Text] Huhhot, 23 Aug (ZHONGGUO XINWEN SHE)—The petroleum industry has begun to develop on the vast grasslands of Inner Mongolia. The Erenhot oil field has started production and the Huhhot oil refinery will soon be built. Nearly 400 km of pipeline are being laid. The project will entail a huge amount of money, 1.74 billion yuan in all.

More than 10,000 oil workers are now in Erenhot, in northern Inner Mongolia, to develop the Erenhot oil field. A number of wells are producing over 800 tons of crude oil a day. The output is expected to reach 350,000 tons toward the end of this year, and the annual output of crude oil will reach 1 million tons next year.

In the meantime, 378 km of crude oil pipelines are being laid and the terminal project has been completed.

The site for a large oil refinery has been chosen on the southern outskirts of Huhhot. The construction of this refinery will soon start and, after completion, it is expected to refine 1 million tons of oil [a year].

High-Yield Gas, Oil Wells Sunk Off Shanghai

40100064c Beijing XINHUA in English 1058 GMT 2 Aug 89

[Text] Shanghai, August 2 (XINHUA)—Two high-yield oil and gas wells have been sunk in the offshore of the East China Sea near Shanghai, China's leading industrial center.

An expert in marine geology said this indicates that the continental shelf of the East China Sea is rich in oil and gas resources.

A test on three oil-bearing layers in one of the wells shows that the well is expected to turn out 885,000 cubic meters of natural gas and 132.5 cubic meters of condensate.

The other well sunk early this year is able to generate 1.486 million cubic meters [of natural gas] and 1,892 cubic meters of condensate.

The two wells were jointly sunk by the Shanghai Marine Geological Survey Bureau and the Yellow Sea Petroleum Corporation of the China National Offshore Oil Corporation.

It has been learned that the two units plan to sink another gas and oil well this year.

New Oil-Bearing Structures Found at Shengli

40100064b Beijing XINHUA in English 0703 GMT 4 Aug 89

[Text] Beijing, August 4 (XINHUA)—Twelve new oil-bearing structures have been verified in the Shengli oil field, in east China's Shandong Province, the overseas edition of PEOPLE'S DAILY reported today.

The 12 oil-bearing structures are spread over a 5,000-square-kilometer offshore and tidal area at the mouth of the Yellow River.

So far, six of the newly found oil deposits have been exploited. They have a combined annual production capacity of 52.5 million bbl [barrels] of oil.

Citing the Gudong oil field as an example, the paper described it as the largest and most profitable offshore oil field in China. By the end of 1988, the Gudong oil field had produced 88.2 million bbl of oil and earned a net profit of 1.92 billion yuan, two-thirds more than the total amount invested in the development of the oil field.

To speed up offshore exploitation, the Shengli oil field set up an offshore oil drilling engineering corporation, imported four drilling rigs and sank 20 wells at the mouth of the Yellow River.

Supply and Demand Problems in Oil-Short Shaanxi

40130115c Xi'an SHAANXI RIBAO in Chinese 15 May 89 p 2

[Article by Wu Guanghua, manager, Provincial Oil Company]

[Excerpt] [Passage omitted] Shaanxi is a province with an oil shortage; 90 percent of oil products must be brought in from outside. Especially in the current situation of inadequate oil resources and transportation difficulties, the difficulty of supplying Shaanxi's petroleum has been increased. In 1989, the petroleum requirements of Shaanxi were between 900,000 and 950,000 tons, while the total resources allocated for Shaanxi by the state in planning for the whole year totaled around 650,000 tons. This year, the gap between supply and demand on Shaanxi's petroleum market is still 250,000 to 300,000 tons, requiring that we rely on our own extraction as a solution. The Provincial Petroleum Company has made conscientious arrangements regarding this year's petroleum supply work.

1. Under the general principles of ensuring key areas, controlling consumption, rational distribution and conservation of oil, oil for agricultural uses throughout the province will be given priority, appropriate arrangements will be made and supply will be prompt. The special state provisions for quotas on oil used in agriculture will be strictly carried out and no diversion will be permitted. Regarding oil used for flood control, drought relief and oil obtained from grain and cotton, the fulfillment of commitments will be ensured. Oil requirements involving the lives of the people, such as urban public transportation, the transport of grain and vegetables, oil needs for holiday and weekend passenger and freight transport; for public safety, fire-fighting, medical treatment, environmental sanitation, foreign tourist travel, universities and colleges and for postal, telecommunications and news organizations along with the oil needs of leading party and government bodies have all been arranged early on and supplies guaranteed. The utmost will be done to ensure the basic requirements of those businesses and sectors, such as the oil needs of the key industries of energy, transportation and raw materials, which are in need of strengthening as part of the state's economic readjustment. Regarding oil needs for production of light industry and textile products urgently required by the market and for foreign trade, the utmost must also be done to provide for these. Without exception, the supply of oil to those capital construction projects halted as part of readjustment will be stopped.

2. To ensure the basic oil requirements of each of Shaanxi's sectors, the provincial petroleum distribution system, in addition to earnestly carrying out the oil allocation work contained in state planning, also must take every measure to execute well independent oil extraction outside of planning; and especially to handle well the purchase of locally produced oil to strictly control the outward flow of locally produced oil through improper channels. To overcome the problem of inadequate funds for independent oil extraction, we will organize the major oil consumers to pool resources to purchase oil and pool resources to purchase 80 tank trucks, invite all concerned sectors to assist us and to jointly solve the problem of insufficient supply on the petroleum market.

3. Work to broaden sources while vigorously reducing consumption. For the past several years, China's power consumption has been very high. Per unit of output value, China's consumption is 6.1 times that of Japan, 2.3 times that of the United States and 1.7 times that of the Soviet Union. Some organizations in Shaanxi utilize oil without planning and consume without quotas in astonishing amounts. Therefore, simultaneous with

improving planning and management, effective oil conservation measures must be promoted. In addition, petroleum safety work cannot be taken lightly. This year a level at which no incidents occur certainly will be realized.

4. Rectify the market and work hard to execute unified management. Over the past several years, those organizations and individuals illegally involved with petroleum in society have been on the increase. This has seriously interfered with the market sequence and the normal operation of the national economy. Based on investigation, along the roads in Xi'an, Lintong, Weinan, Zhouzhi and Huxian, scattered individual gas stations and small-scale oil refining plants illegally dealing in petroleum can be seen everywhere. On the 30-kilometer section of road from Lintong to Weinan, there are 26 individual gas stations, and within the 10 kilometers from the town of Mawang in Changan County to the Xi'an Steel Plant there are 18. Based on incomplete statistics, the Weinan area has 106 such stations. Some of the petroleum they handle is bought illegally through illegitimate methods from oil refineries and petroleum companies, some is the inferior quality product of small refineries, some is from some key industries and large oil consumers which have resold at a profit, and some is sold secretly by drivers enroute. Their prices are more than double the state's negotiated oil price, moreover, storage of the oil is extremely unsafe. The harm to society is great and the provincial government has already decided to initiate, on a province-wide scale, inspection and rectification led by industrial and commercial administration departments and with the close cooperation of public security, fire-fighting and the petroleum company to eliminate all types of factors interfering in the petroleum market sequence and ensure the normal operation of the petroleum market.

5. Tighten sales and rectify management. To ensure the fairness and honesty of petroleum management work and to put an end to the use of privilege for personal gain, the Provincial Petroleum Company specifically formulated 8 regulations for petroleum management, 10 regulations to maintain honesty among staff and workers of the sales system and invited each concerned sector of society to conduct supervision of our work.

Urgency of Developing Nuclear Technology

40130099b Beijing GUANGMING RIBAO in Chinese 27 Apr 89 p 2

[Article by Chen Zhihong [7115 1807 7703]: "Developing Nuclear Tchnology Applications Cannot Be Delayed"]

[Text] Over 100 professors and experts attending the National Nuclear Technology Applications Strategy Conference in Wuchang recently called for China to seize an opportunity for a major effort to develop nuclear technology applications, promote reform and develop economic construction.

The experts pointed out that nuclear technologies include nuclear power technologies as well as isotopes, radiation technologies, and so on. Nuclear technologies are being applied in a wide range of fields in today's world and they have effectively promoted advances in production. Experience in many countries has shown that developing nuclear power is a major way to solve energy shortages and has obvious economic benefits. The costs are 50 to 70 percent lower than oil-fired power and 30 to 50 percent lower than coal-fired power. The risks are far smaller than coal, oil, solar power, and other energy resources. Twenty-six nations and regions in the world have built 417 nuclear power stations and another 119 are under construction. The Chinese mainland, however, has only two stations under construction and they are far from capable of alleviating our national power shortage. China has a power shortage each year of 70 billion kWh which causes about 200 billion yuan in lost value of output. Thus, we should seize the favorable opportunity at present of surplus supplies of the nuclear power fuel enriched uranium on international markets and strive to develop nuclear power to promote progress in reform, opening up, and industrialization.

The experts also pointed out that nuclear technologies like isotopes and radiation technologies have an extremely broad range of applications. They are an effective tool for research in other fields and can directly serve industrial and agricultural production and the people's daily lives. The developed nations have applied isotopes and radiation technologies to form many new industries and achieved enormous economic and social benefits. China has rather broad applications in agriculture and medicine and has made achievements. For example, the nuclear technology of radiation treatment is now a primary means of treating tumors. Irradiation of silkworm eggs, fish, and prawns increases output. Nuclear analysis has contributed in China in energy science, materials science, life science, environmental science, archaeology, forensic medicine, and other fields. However, nuclear technologies are mainly in the beginning stages of industrial applications and there is major potential as well as many difficulties. They called on all relevant areas to struggle together with the experts to develop nuclear technology applications and make new contributions to national construction.

Nuclear Power Construction Now Under Unified Management

40130115a Beijing RENMIN RIBAO in Chinese 12 May 89 p 1

[Text] The State Council's General Department today issued a notification requiring that nuclear power construction implement concentrated unified management.

The "notification" states that recently some localities have put forward demands for construction of nuclear power plants. In view of the complexity of nuclear power technology, the strict safety requirements, its involvement with a series of issues of power structure and rational distribution, and its great impact on the economic development of the entire country, nuclear power construction must be planned and programmed by the state in a unified manner. The "notification" stipulated that nuclear power construction must be brought into line with state planning, planned in a unified way and led by the Ministry of Energy Resources, that the China Nuclear Energy Industry Corporation is to be given the authority and entrusted with implementation of unified management and is to have direct responsibility for the management of nuclear safety work.

Qinshan's No 1 Steam Generator Installed

40130104a Shanghai JIEFANG RIBAO in Chinese 6 May 89 p 1

[Article by Zhang Zhiyuan [1728 1807 6678]: "Qinshan's No 1 Steam Generator Installed; Key Equipment Arrives at Construction Site"]

[Text] Construction at the 300,000-kilowatt Qinshan Power Plant, China's first nuclear power plant, is reaching a climax. At 11 am on 2 May the No 1 steam generator, which was manufactured in Shanghai, was successfully installed. The successful installation of the largest piece of domestically manufactured equipment in the power plant marks the fact that the final major battlefield in the construction of a nuclear power plant in China has switched from the equipment manufacturing base in Shanghai to the construction site at Qinshan.

Shanghai has been officially engaged in the development and manufacturing of nuclear power plant equipment since 1982. Most major equipment has essentially been completed as of 1 May. The government has certified three pieces of key equipment only a few countries in the world can produce, i.e., steam generator, reactor mechanism, and turbine generator. In the past 7 years, more than 80 industrial and academic institutes in electrical engineering, mechanical engineering, aerospace, shipbuilding, instrumentation, metallurgy, chemical engineering, and machining completed 264 major R&D projects and solved over 300 technical hurdles. They undertook 136 projects to develop non-standard equipment and manufactured 1,366 pieces of equipment. They are now in the final stage of production and delivery.

Before the nuclear safety dome was successfully installed, approximately 10 pieces of major equipment, including the pressure casing, main pump and turbine generator, were installed. By the end of this year, all nuclear and non-nuclear equipment will be installed.

Yang Zhongwan [2799 1813 8001], director of the Nuclear Power Office at Shanghai, told reporters that based on the progress in Qinshan, Shanghai has demonstrated its capability to produce the entire set of equipment necessary to build a world class 300,000-kilowatt nuclear power plant. Some nuclear experts commented after their visit to Qinshan that China has made much faster progress in the construction of its own first nuclear power plant.

Increased Use of Solar Energy in Tibet

40100067a Beijing XINHUA in English 1333 GMT 26 Aug 89

[Text] Lhasa, 26 Aug (XINHUA)—The Tibet Autonomous Region has made great achievements in utilizing solar energy in recent years, according to a seminar held here recently by the Tibet Regional Association of Solar Energy.

Buildings with a total floor space of 80,000 square meters in Tibet are now heated by solar energy—50 percent of all the solar-heated housing space in China. There are 700,000 square meters of solar-energy greenhouses, 15,500 square meters of solar-energy heat collectors, 7,300 sets of solar cooking stoves and solar photoelectric batteries with a maximum capacity of 20,000 Watts in the region. The total solar energy collected every year is equal to that produced by 10,000 tons of coal.

Located on the highest plateau on earth, most of Tibet has sunshine for 2,500 to 3,400 hours a year with the total volume of heat at 160 to 196 large calories per square centimeter, the highest in China and one of the highest in the world.

The Tibetan people have made use of solar energy since ancient times by building dwelling houses with short eaves and black window frames.

Since timber is scarce in Tibet, in recent years the government has been encouraging the use of alternative energy sources, including solar energy.

Not long ago, about 1,000 solar cooking stoves were put on sale in Lhasa. They were sold out within 4 days.

It is estimated that by using the existing solar cooking stoves in the region alone, about 2 million yuan worth of fuel can be saved annually. The regional government will continue popularizing the solar cooking stoves and is expected to increase the number of such stoves in the region to 50,000 by the year 2000, thereby saving 50 million yuan worth of fuel a year.

Conservation Said Vital to Closing Nation's Energy Gap

40130110b Beijing RENMIN RIBAO in Chinese 17 Jun 89 p 4

[Article by reporter Lu Mu [7627 3668]: "China Has a Substantial Energy Resource Shortage; Conservation Work Is Urgent"]

[Text] An official in the State Planning Commission revealed on 16 June 1989 that all of China will experience substantial energy shortages in 1989. Still, with frightening losses and waste, there is great potential for energy conservation. He called on units which use energy, particularly plant and mining enterprises, to use conservation to increase output and to use energy conservation to seek results in a major effort to develop more energy conserving plants, energy conserving industries, and energy conserving urban activities.

This official indicated that our energy resource shortage will exceed 30 million tons of standard coal in 1989. This includes a shortage of 70 billion kWh of power, 5 million tons of oil, and 30 million tons of coal. There are severe shortages of coal, power, and oil. Experts predict an energy shortage of about 200 million tons of standard coal during the Eighth 5-Year Plan. This energy resource shortage will rise to 300 to 400 million tons of standard coal by the end of this century. In another area, there is also serious loss and waste of energy resources. The amount of energy resources consumed per $100 million in GNP in China is three to four times that in several developed nations and double that in the developing country India. There are substantial differences in energy consumption indices between advanced and backward enterprises within the same industry in China. For example, total energy consumption per ton of steel ranges from a minimum of 1.17 tons of standard coal to a maximum of 2.28 tons, 95 percent higher. Total energy consumption per ton of chemical fertilizer from small plants ranges from a minimum of 10 million kilocalories to a maximum of 18 million kilocalories, 80 percent higher. The amount of coal consumed per ton of cured cement ranges from a minimum of 107 kg of standard coal to a maximum of 215 kg, or double. The minimum amount of standard coal consumed to generate 1 kWh of electricity is 302 g, while the maximum is 1,000 g, 2.3 times higher. The power consumed per weighed box of plate glass ranges from a minimum of 2.9 kWh to a maximum of 28.8 kWh, nearly 9 times higher.

This responsible comrade emphasized that all regions and sectors should focus more on energy conservation work. Stronger macro regulation and control, appropriate increases in inputs to promote advances in energy conservation technologies, perfecting energy conservation organs, and reinforced leadership should be combined with active research and formulation of urgent energy conservation laws and regulations to move energy conservation work onto the track of the legal system and achieve even greater energy conservation results.

T10

22161
30
NTIS
ATTN: PROCESS 103
5285 PORT ROYAL RD
SPRINGFIELD, VA 22161

Foreign Broadcast Information Service (FBIS) and Joint Publications Research Service (JPRS) publications contain political, economic, military, and sociological news, commentary, and other information, as well as scientific and technical data and reports. All information has been obtained from foreign radio and television broadcasts, news agency transmissions, newspapers, books, and periodicals. Items generally are processed from the first or best available source; it should not be inferred that they have been disseminated only in the medium, in the language, or to the area indicated. Items from foreign language sources are translated; those from English-language sources are transcribed, with personal and place names rendered in accordance with FBIS transliteration style.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by FBIS/JPRS. Processing indicators such as [Text] or [Excerpts] in the first line of each item indicate how the information was processed from the original. Unfamiliar names rendered phonetically are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear from the original source but have been supplied as appropriate to the context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by the source. Passages in boldface or italics are as published.

SUBSCRIPTION/PROCUREMENT INFORMATION

The FBIS DAILY REPORT contains current news and information and is published Monday through Friday in eight volumes: China, East Europe, Soviet Union, East Asia, Near East & South Asia, Sub-Saharan Africa, Latin America, and West Europe. Supplements to the DAILY REPORTs may also be available periodically and will be distributed to regular DAILY REPORT subscribers. JPRS publications, which include approximately 50 regional, worldwide, and topical reports, generally contain less time-sensitive information and are published periodically.

Current DAILY REPORTs and JPRS publications are listed in *Government Reports Announcements* issued semimonthly by the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, Virginia 22161 and the *Monthly Catalog of U.S. Government Publications* issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

The public may subscribe to either hardcover or microfiche versions of the DAILY REPORTs and JPRS publications through NTIS at the above address or by calling (703) 487-4630. Subscription rates will be provided by NTIS upon request. Subscriptions are available outside the United States from NTIS or appointed foreign dealers. New subscribers should expect a 30-day delay in receipt of the first issue.

U.S. Government offices may obtain subscriptions to the DAILY REPORTs or JPRS publications (hardcover or microfiche) at no charge through their sponsoring organizations. For additional information or assistance, call FBIS, (202) 338-6735,or write to P.O. Box 2604, Washington, D.C. 20013. Department of Defense consumers are required to submit requests through appropriate command validation channels to DIA, RTS-2C, Washington, D.C. 20301. (Telephone: (202) 373-3771, Autovon: 243-3771.)

Back issues or single copies of the DAILY REPORTs and JPRS publications are not available. Both the DAILY REPORTs and the JPRS publications are on file for public reference at the Library of Congress and at many Federal Depository Libraries. Reference copies may also be seen at many public and university libraries throughout the United States.